



GROWTH MINDSET IN THE CLASSROOM

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Abstract:

Mindsets are our beliefs and thoughts about ability, traits, intelligence and success. A student with a growth mindset thinks that intelligence is malleable whilst a student with a fixed mindset thinks that intelligence is stable. Students with fixed mindsets do not put much effort into learning. Dweck formed the concept of mindset in 2006 after many years of researching mindset. In recent research, many interventions on mindset have been undertaken and results have showed that growth mindset is worth examining. The purpose of this study is to review literature about growth mindset related to learning, explore the effect of interventions on growth mindset and examine what teachers can do to encourage a growth mindset in children.

Keywords: mindset, growth mindset, fixed mindset, intervention

1. Introduction

The concept of mindset was formed by Dweck in 2006. Mindsets (Implicit Theories of Intelligence) are our beliefs and thoughts about ability, traits, intelligence and success. Dweck identified two types of mindsets: growth (An Incremental Theory of Intelligence) and fixed (Entity Theory of Intelligence). According to Dweck, a student with a growth mindset thinks that intelligence is malleable and can be developed by hard work, persistence and effort whilst a student with fixed mindset thinks that intelligence is stable. Research on students' mindsets suggests that mindset can have an important role in students' goals, achievement and motivation (Zhang, Kuusisto & Tirri, 2017; Andersen & Nielsen, 2016; Haimovitz & Dweck, 2016; Claroa, Paunesku & Dweck, 2016; Warren et al. 2018; Bettinger et al. 2018).

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Dweck and his colleagues who studied for years have found that how students perceive their own skills has an important role in learning and motivation. They indicate that if the mindset of a student changes, the success increases. Students who believed that their intelligence could develop were more successful than those who believed that their intelligence was constant. Students who learned that they could improve their brains and intellectual skills through structured training were more successful. Focusing on the processes that lead children into learning, such as hard work and devising new strategies, can encourage mindset. The Growth mindset approach helps learners overcome difficulties and obstacles in learning and helps them feel better in short or long term (Dweck, 2015a). Mindset not only affects people's thoughts and adaptation mechanisms but also their attitudes and judgements towards other people (Dweck, 2000).

Growth mindset individuals focus on learning goals because their motivational framework is mastery oriented. They are more resilient after failure, want to try challenges and put effort into enhancing their ability and intelligence. On the other hand individuals with a fixed mindset place more emphasis on performance goals. As a consequence they tend to not put much effort into learning (Zhang, Kuusisto & Tirri, 2017), avoid challenges and avoid negative criticism (Warren et al. 2018).

It is indicated that important parts of intelligence can be developed and that the brain has a greater potential for development and change than ever believed (Dweck, 2010; Owens & Tanner, 2017). There are similarities between the ideas expressed by Dweck in this study and those described by Woollett, Spiers & Maguire (2009) and Spiers (2014). They reported that the development of expertise is possible with extensive effort, it is suggested that skills can be lost if not practiced.

Recently several studies have demonstrated that psychological interventions can convey a growth mindset to youths and have positive effects (Aronson et al., 2001; Blackwell et al., 2007; Good et al., 2003; Claro et al., 2016; Bettinger et al., 2018). These interventions are based on the evidence on the malleability of the brain. Conveying the message of the malleability of intelligence, the interventions teach the students to think of their brains as muscles, which get stronger with exercises (Bettinger et al., 2018). Even brief mindset interventions have impact which explains how the brain has the ability to adapt new information and demonstrates the value of effort in its positive impact on students' learning. Such interventions have great potential in contributing to learning in schools. Short training on different courses can be applied at all levels and can improve the achievement of students (Tirri & Kujala, 2016). Portsmouth University launched a project called "Changing Mindset", testing if growth mindset intervention works in UK's schools. Pupils who participated in the growth mindset intervention in 2013 made an average of two additional months' progress in English compared to those in the control group. This indicates that "*the finding for English was close to statistical significance, and this approach shows evidence of promise*" (Rienzo, Rolfe & Wilkinson, 2015:34).

It is the teacher's responsibility to prepare a positive environment in which a student can develop (Dweck, 2017). Every student has a different mindset in the classroom. Some students are curious to learn new things whilst others may have low

motivation and learning a new subject can be frightening for these students (Kiger, 2017). It is indicated by Blackwell, Trzesniewski, & Dweck (2007) that a child's focus on assessing real differences between individuals in the speed of their intellectual growth and capacity for learning can have desperate consequences for motivation. Conversely, focusing on developing intellectual capacities is a great benefit for their motivation.

In recent years, there has been an increasing interest in growth mindset in the realm of education. Some scientists investigate the effects of mindset, some schools try to foster a growth mindset culture, and teachers hold workshops and seek ways of cultivating growth mindset in children as well. There are good reasons to pay attention to a profound understanding of growth mindset and to examine the evidence underpinning its contribution to learning environments. The purpose of this study is to review recent research on growth mindset focusing on two research questions. It surveys how interventions on mindset support children and how teachers create a classroom environment that foster a growth mindset. The research questions are as follows:

1. How can interventions on growth mindset help children?
2. How can teachers create a classroom environment that encourages a growth mindset in children?

2. Research Design

The research was conducted in accordance with descriptive survey model. We reviewed the literature regarding mindsets.

3. Findings

The findings of this study were reviewed under two sub-headings: interventions on growth mindset and classroom environment that encourages a growth mindset.

3.1 Interventions on Growth Mindset

The psychological interventions are brief exercises which focus students' thoughts, feelings and beliefs instead of teaching academic content. They had important short or long-term effects on students' achievement (Yeager & Walton, 2011). Studies have shown that growth mindset can be taught. In studies of Mindset, pre-post-test is generally applied and some brief psychological interventions results are significant. The results of these studies show that the mindset of students can be changed and that this change has an impact on academic achievement, motivation and resilience (Donohoe, Topping & Hannah, 2012).

A large body of research demonstrates that interventions have an influence on the motivation and academic achievement of students. Blackwell, Trzesniewski & Dweck, (2007) did an intervention with 373, 7th grade low income participants. In eight 25-minute workshop sessions, one per week, students in the experimental group were taught that intelligence is malleable and can be developed by challenge; students in the

control group had a lesson on memory. The results revealed that adolescents who affirm growth mindset also affirm stronger learning goals: *“they have more positive beliefs about effort with the result that they choose effort-based strategies in response to failure, boosting mathematics achievement over the junior high school transition.”* The intervention group demonstrated more motivation and gained better results. There was also a notable improvement in vulnerable students’ motivation.

To understand stereotypical effects on undergraduates Aronson, Fried & Good (2001) created an intervention consisting of three 1 hour laboratory sessions with 109 participants. The Intervention group participated in an intervention pen pal programme that engaged numerous attitudinal change techniques designed to teach them and help them internalize that intelligence is malleable. Students were informed that they would answer one letter from a seventh grader to impress upon their pen pals the view that intelligence is not stable, but malleable and can grow like a muscle with mental work. Students in both conditions were asked to build into their letters’ examples from their own life. On the second day, they wrote another letter with the same message to a new pen pal. On the third day they turned their letters into brief speeches, which were then audiotaped for use in future interventions with at risk children. In the control group, the orientation was designed to offer the same experience but the difference was only in the underlying message about the nature of intelligence. They reported that after three sessions African American students created a beneficial change in their own attitudes about intelligence. *“This change improved their academic profile to a significant degree compared to control groups. They reported enjoying and valuing academics more and they received higher grades. The intervention had some of the same positive effects for White students, though not to the same degree”* (Aronson, Fried & Good, 2001:11).

A field experiment with 385 Norwegian high school students, Bettinger et al. (2018), investigated how schools can increase students’ perseverance in math by shaping students’ beliefs in their abilities to learn growth mindset. They developed a computer program with three online sessions, each lasting about 45 min. The treated students have to do three cognitive exercises. Firstly, students have to read an article about the brain’s potential to grow and change. The article presentation runs several times and has a stylized visual layout with illustrations. Secondly, students are asked to summarize the article explaining how its message relates to their own lives. Thirdly, students are asked to give advice to a friend who was struggling in school. Students in the control condition learnt about basic brain functions and their localization and answered reflective questions. In session, 3 students picked from easy questions which did not require learning new skills, or hard questions, which may require more effort but provided more learning opportunities. They found effects on students who previously had a fixed mindset or had low achievement prior to the intervention. They suggest that schools and teachers can improve students’ growth mindsets, academic performance, especially amongst the poorest performing students. In the context of Norway where students choose vocational or academic tracks, the finding suggests that opportunities which improve students’ mindsets earlier in their career, potentially influence their choice of tracks.

With 1,587 Second-grade participants, parents receiving a reading intervention were told about the malleability of their child's reading abilities; they read books with their children with a constructive approach and supported their child by praising effort rather than performance. This intervention increased the reading and writing achievements of all participating children (Andersen & Nielsen, 2016).

Another intervention was held by Portsmouth University in the form of a project called 'Changing Mindset'; 286 Pupils in Year 5 were participants. The intervention group received a six-week course of mentoring and workshops with a focus on growth mindset. The finding for English was close to statistical significance, and '*this approach shows evidence of promise*' (Rienzo, Rolfe & Wilkinson, 2015: 34).

Collectively, the studies cited outline a critical role for growth mindset interventions. Mindset is important when students face challenges in school (Burnette et al. 2013, Claro et al., 2016). Claro et al. (2016) tested whether academic mindset interventions can have a meaningful impact on academic outcomes delivered to a large sample. They focused on effects amongst poorly performing high school students in the United States. The intervention raised achievement of underperforming students over an academic semester. With Growth-Mindset interventions, students learn that the brain can be developed when they are working on challenging tasks and also that it is an opportunity for their development to deal with challenge as well (Claro et al., 2015).

In the research on mindset interventions, they applied Dweck's questionnaire of 'Implicit Theories of Intelligence for measuring children's mindsets.' There are six items in the questionnaire: the first three items are used for measuring the fixed mindset. The responses are measured based on a 6-point Likert scale (1-Strongly Agree to 6-Strongly Disagree). A high aggregate score of the first three questions with higher scores demonstrates more of a fixed mindset (Warren et al., 2018).

Kristjansson (2008) criticizes Dweck's mindset questionnaire in that the scale leads to 'exaggeratedly divisive answers' which may not be a true reflection of the learner's opinion. Despite the criticism over the use of Dweck's mindset questionnaire, the majority of the studies have been carried out by or in conjunction with Dweck (Donohoe, Topping & Hannah, 2012).

Although a significant body of research on interventions demonstrates that interventions have had a short and long-lasting impact on the performance and motivation of the student, there are some interventions which did not find any significant relation (Donohoe, Topping & Hannah, 2012). It is suggested that the efficacy of social psychological interventions depends on factors in the context. Such interventions could not be effective in contexts without challenging opportunities for learning (Walton & Cohen, 2011; Claro et al., 2016). It can be said that it is important to combine psychological interventions with powerful learning environments.

Mindset interventions are not magical, they are tools to focus important psychological processes in the class (Yeager & Walton, 2011) and produce growth minded lifelong learners. Also interventions cannot take the place of traditional education reforms, they do not teach academic knowledge or skills to students but make existing structures more effective. Interventions help students to acquire

appropriate learning opportunities by changing their mindsets (Yeager & Walton, 2011, Walton & Cohen, 2011).

3.2 Classroom Environment That Encourages a Growth Mindset

Table 1: Approaches in Growth Mindset and Fixed Mindset (Dweck, 2010; Dweck, 2017)

Key Concepts	Fixed Mindset	Growth Mindset
Goal	Focus on Performance (Look Smart at all time and all cost).	Focus on Learning (Learn at all times and at all costs).
Effort	Much effort means low ability and low intelligence. "Studying hard makes me feel like I am not very smart."	Tend to think that effort improve ability. "I have to work hard for achievement"
Challenge	"They do not want to be in a situation where they would not look smart. They may give up, become defensive acting bored. The statement 'boring' is a cover it means I am afraid to try."	They want tasks which teach them new things and develop them.
Mistake	Setbacks express a lack of ability. Try to hide their mistakes. They tend to not correct their errors.	Think that mistakes are a natural part of learning. "I would study harder and try different learning strategies next time."

As demonstrated in Table 1, Dweck (2015a, 2017) identified some approaches to fixed and growth mindset after doing many research. Teaching growth mindset approaches helps learners overcome difficulties and obstacles in learning and helps them feel better. The classroom environment created by the teacher can improve students' mindsets (Smyth, 2017). Teachers' mindsets establish how teachers react towards the students. Teachers' mindsets determine their ideas about students; because of different mindsets, they have different ideas about students. When two teachers talk about a student they may feel like they are talking about two different students (Sousa & Tomlinson, 2011).

Educators want students to profit from their efforts. A growth mindset in the classroom helps students to seek learning, to love learning, and to learn effectively (Dweck, 2016). Sousa & Tomlinson (2011) suggest that a teacher with growth mindset creates a positive learning environment for students as well as addressing the social-emotional needs of students. It is important to change the strategies for teachers who have a growth mindset in line with students' needs. In such an environment students' brains produce endorphins that source the frontal lobe to remember the learning objective better (Owens & Tanner, 2017). In a recent case study, Rissanen et al. (2016) examined how mindsets affect teachers' pedagogical thinking and practices. They found out that teachers' mindsets strongly shaped their understanding of the teaching, studying, learning and motivational processes. The teacher with growth mindset was more process focused and her most important goals as a teacher was giving emotional support and helping students find appropriate study methods.

Attributing children's good performance to intelligence and praising them may have a disagreeable impact on children's overall achievement. In their research, they asked children to choose between performance and learning goals for their future problem-solving tasks. Whilst children praised for hard work chose problems that promised increased learning, children praised for intelligence chose problems which let them continue to show good performance (Mueller & Dweck, 1998). However, teachers may tend to seek opportunities to praise their students' skills and provide opportunities to see how praise impacts on the students' learning process like their effort, strategies, concentration, choices, persistence, and whether it helped them remain motivated, confident, and effective (Dweck, 2010).

Dweck (2010) argues that teachers can help children to develop a growth mindset by praising them for their effort and persistence, rather than their innate intelligence. For example, if a teacher wanted to praise a pupil for a piece of work, they should say: *'Well done for working really hard'*, rather than *'Well done, you must be really smart.'* The first statement focuses on process versus result. Teachers should focus on the process rather than on the outcome (Smyth, 2017). People can have different mindsets in different domains. It is suggested that growth mindset correlates negatively with performance goals and positively with learning goals (Burnette et al. 2013).

Dweck suggests that students who were praised for their intelligence later lied about their scores. This could mean that mistakes were so humiliating that they could not admit them. Praising children's intelligence can damage their performance and their motivation. *'If success means they are smart, then failure means they are dumb'* (Dweck, 2017:178). Failure does not mean you lack competence; failure is a problem to be faced and learned from. In one study 7th graders were told how they would respond to academic failure, the results were interesting that the students with growth mindset said that they would study harder for the next test, while the students with fixed mindset said that they would think of cheating. In another study, college students with growth mindset wanted to correct their mistakes unlike the fixed mindset students (Dweck, 2017).

Following Dweck's ideas about mistake, it could be said that learning from failure requires accepting and embracing the mistake. Because mindsets have changed the meaning of mistake (Dweck 2017), to make mistakes has become more positive in recent years. A notable example of embracing mistakes and celebrating them could be the day which is celebrated in Finland recognized for its high quality education system and well educated teachers. The Finland's National Day of Mistakes is celebrated on 13 October since 2010. The origin of the idea was, Finland will need countless businesses and jobs in the future but peoples' fear of failure and their inability to perform in the role is an obstacle for them when finding and getting a job. On Finland's National Day of Mistakes, successful people are invited to speak and provide inspiration to others by describing their failures in their own journeys of success (Wood, 2017). The message being that making mistakes is a normal and healthy part of life which leads to success. A teacher who follows Dweck's ideas can use the statement that *'It is good to make mistakes, we learn from our mistakes'*, this could help students to

feel more comfortable so repeating positive statements help them not to feel embarrassed for making mistakes but to encourage them to embrace them as learning experiences.

Focusing on the development of the intellectual potential of pupils is beneficial to their motivation (Blackwell, Trzesniewski & Dweck, 2007). It is important to praise the effort of the student, but as a result of this effort it is expected that the student will learn. It is good for students to apply lots of effort but students should achieve their goals with this effort. After putting lots of effort into a task and failing to learn a student needs to review his/her strategies. When students are stuck and fail to progress they need new strategies and input from peers, books, internet or teachers (Dweck, 2015a). Highly motivated and resilient students believe that their skills can develop with effort and learning (Sousa & Tomlinson, 2011). Other impacts of mindset on students, as explained earlier, are indicated in recent research postulates that encouraging growth mindset in children could also help to improve students' creativity. Warren et al. (2018) reported the relationship between implicit theories and creative performance, finding that within a sample of infant school children, holding a stronger fixed mindset was related to lower scores on a divergent thinking task, which has been linked to creativity. Teachers' statements to students send an implicit message. Whilst some messages motivate students, some messages can adversely affect students. It is indicated in table 2 some statements of growth and fixed mindset (Dweck, 2015; Dweck, 2017). Using the statements of growth mindset can help to cultivate a growth mindset in student.

Table 2: Statements of Growth and Fixed Mindset

Growth Mindset Statements	Fixed Mindset Statements
"When you learn how to do a new kind of problem, it grows your maths brain"	"Not everybody is good at maths. Just do your best."
"If you catch yourself saying, 'I am not a maths person,' just add the word 'yet' to the end of the sentence." "I tried but it did not worked yet."	"That's okay; maybe maths is not one of your strengths."
"That feeling of math being hard is the feeling of your brain growing."	"Don't worry; you'll get it if you keep trying." "If students are using the wrong strategies, their efforts might not work. Plus they may feel particularly inept if their efforts are fruitless."
"The point is to grow your understanding step by step. What can you try next?"	"Great effort! You tried your best." "Don't accept less than optimal performance from your students."
"Let's talk about what you have tried and what you can try next."	"You learned that so quickly! You are so smart!"
"Congratulations to for putting such a good effort into this task"	"You are so brilliant; you got an A without even studying!"

The fixed mindset statements do not help students improve or advise how to recover setbacks, they just explain the results about their performance (Dweck, 2017) 'however growth mindset statements focus on students' learning process. Mindset work is sometimes used to advocate why some students are not learning. It is necessary for a

teacher to find a way to help some students learn rather than to find a reason (Dweck, 2015).

In a recent study focusing on understanding more deeply teachers' experiences of growth mindset, teacher participants indicated that the teachers' mindset played an important role and teaching growth mindset lessons affected their mindset and their professional skills like planning, teaching (Minogue, 2017). Strategies of rewarding effort and perseverance are successful and can be applied to the current student population in interesting and relevant ways. Learning goals encourage persistence and hard work when confronting challenges. Setbacks are seen by students with learning goals as obstacles that must be overcome, influencing motivation and performance in a positive way (Minogue, 2017). Having the right mindset helps teachers successfully differentiate for students' interests, and their learning profile. It is important to acknowledge that all students have a different learning style and also to appreciate these different learning styles. Therefore teachers should use different learning approaches not teach with only one (Sousa & Tomlinson, 2011).

Children should be encouraged to build a growth mindset through discussions and activities in the classroom. Teachers can prepare lesson plans or activities that support the growth mindset to apply to the class. Growth mindset can be integrated into any lessons. The key phrases supporting growth mindset are 'effort for learning', 'embrace challenges', 'persevere for learning', 'learn from criticism', 'goals for growth', 'learn from mistakes'. Children books about growth mindset are really good resources, some examples are: Muncaster & Clarke, 2016); 'Your Fantastic Elastic Brain' by Joann Deak (2017), which encourages children to be neuro sculptors who shape their own brain by learning new things; 'Thanks for the Feedback' by Julia Cook (2013), which encourages children to see criticism as a useful information; 'Ish' by Peter H. Reynolds (2005); 'The Dot' by Peter H. Reynolds (2004). These brilliant books convey the message that do not worry if you cannot do it yet. 'The Most Magnificent Thing' by Ashley Spires (2014) supports children in persistence in the face of setbacks and encourages the use of different strategies. Another book is 'I Can't Do That Yet' by Esther Pia Cordova (2017), it teaches children to say 'I cannot do that yet' instead of 'I cannot do that'.

If a teacher wants to foster growth mindset in students, these key phrases could be used indifferent lessons throughout the day. A corner in the classroom demonstrating key phrases and activity products could be allocated by the school for growth mindset. It is important to use active methods when applying mindset activities so that students engage in these activities. Drama is an effective teaching method which is enjoyable and could engage students in the mindset activities. Children can be taught that the brain is flexible and can be improved with practice, and that it is an important part of learning to make mistakes. Other key phrases, already stated earlier, could also be employed. Corresponding activities with chosen book helps to reinforce growth mindset. Showing videos about neuron connections benefits children in their ability to be able to identify when they can feel their brain is improving (Muncaster & Clarke, 2016).

4. Discussion and Conclusion

According to Dweck (2010), mindsets are our beliefs about intelligence, traits and abilities and they affect our goals, achievement, motivation and attitudes. If a student thinks that intelligence is adaptable and can be developed by hard work, persistence and effort, it shows that student has a growth mindset, on the other hand a student with fixed mindset thinks that intelligence is stable and cannot be done much to improve it. The students who think that their intelligence could be improved are more likely to be more successful than those who think that their intelligence comes from birth and it cannot be changed much.

The researches in this study show that mindsets can be changed by interventions. Students' fixed mindsets could be changed to growth. Interventions may an influence on the motivation and academic achievement of students.

Students who learnt that they could improve their brains and intellectual skills through structured training were more successful. Interventions were more effective for students who are vulnerable and in difficult circumstances. Because fixed mindset beliefs particularly harm minority students, they also contribute to overall low achievement and participation (Boaler, 2013).

Students need to learn about how the brain grows. For teachers we recommend reading students' books about growth mindset and using them to engage students' classroom activities like drama and dramatization. Reading every day for 10-15 minutes is also a crucial activity. Also teachers can invent stories which enhance growth mindset. It is also recommended to teachers to use growth mindset phrases like, 'Yet, perseverance, effort, strategy' every day in their process praise.' 'Growth mindset is a process, it is not a proclamation', says Dweck (2010) so in this process our references must be perseverance, effort, strategy, learning by mistakes.

Teachers' mindsets influence their methods and techniques and approach to students. Growth mindset helps teachers take risks and engage new ideas (Smyth, 2017). As a teacher, Smyth became increasingly aware of the significance of seeking and developing strategies to support the children in her class (Smyth, 2017). From our perspective, this process is a mindset learning process and still continuing, we found ourselves talking with students about how the brain is malleable and how we can develop our abilities as well as our goals; we also learnt the importance of effort and devising new strategies.

In a growth mindset class culture, assignments and homework should not be repetitive but should be challenging to students (Kazakoff & Mitchell, 2017). Teachers should support students to learn trying new strategies instead giving up when they face challenges. Teachers encourage students to take risk, to try challenges. It should be widespread to think that making mistakes is normal as a consequent students feel more confident and could try challenges.

Growth mindset should be seen as a learning tool which motivates students and make them responsible from their learning process. Growth mindset approach is worth to apply in students and in teachers. Especially in classrooms, it can be much more

effective when applied in the whole school. As Boaler (2013) reported, schools should be encouraging growth mindset beliefs. The encouragement of a growth mindset culture will require schools to move to grouping practices that do not label and give positive messages to students, and teaching approaches that contribute varied learning pathways for all students.

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